Appl. No. 10/692,957
Amdt. dated Feb. 14, 2006
In Resp. to Office Action of Nov. 14, 2005

Amendments to the Claims:

This listing of claims will replace all prior versions and listings of claims in the application.

1. (Original) An asynchronous first-in-first-out (FIFO) data structure, comprising:

a FIFO memory having a depth d in which d is an integer; and

a code generator coupled to the FIFO memory and providing a first code sequence of length 2d, the first code sequence having a circular property and a Hamming length of one for any two consecutive codes of the first code sequence, the first code sequence being generated from a second code sequence by removing one or more pairs of mirrored codes of the second code sequence.

2. (Original) The data structure according to claim 1, wherein the second code sequence has the circular property and the Hamming length of one for any two consecutive codes of the second code sequence.

3. (Original) The data structure according to claim 1, wherein the first code sequence is a Gray-code sequence.

4. (Original) The data structure according to claim 1, wherein the second code sequence is a Gray-code sequence.

5. (Original) The data structure according to claim 1, wherein the code generator is coupled to a write pointer which, in turn, is coupled to the FIFO memory.

6. (Original) The data structure according to claim 5, wherein the write pointer is coupled to the FIFO memory via at least one of a converter and a look-up table.

7. (Original) The data structure according to claim 6, wherein the converter comprises a Gray-to-binary converter.

8. (Original) The data structure according to claim 1, wherein the code generator is coupled to a read pointer which, in turn, is coupled to the FIFO memory.

9. (Original) The data structure according to claim 8, wherein the read pointer is coupled to the FIFO memory via a Gray-to-binary converter.

10. (Currently Amended) The data structure according to claim 1, wherein the code generator is coupled to a read pointer which, in turn, is coupled to ~~a storage device~~ the FIFO memory.

11. (Currently Amended) The data structure according to claim 10, wherein the FIFO memory ~~storage device~~ comprises a bank of registers.

12. (Original) The data structure according to claim 1, wherein the FIFO memory comprises a write data input port and a read data output port.

13. (Currently Amended) The data structure according to claim 1, wherein the FIFO memory comprises a write pointer input and a read ~~point~~ pointer input.

14. (Original) The data structure according to claim 1, wherein the asynchronous FIFO data structure comprises a write clock domain and a read clock domain.

15. (Original) The data structure according to claim 14,
wherein the write clock domain comprises a write clock,
wherein the read clock domain comprises a read clock, and
wherein the read clock and the write clock are asynchronous.

16 (Original) A method for designing an asynchronous data structure, comprising:

writing data to and reading data from a memory of depth d in which d is not equal to a value 2^n and in which d and n are integers;

reducing a first Gray-code sequence of length 2^n into a second Gray-code sequence of length 2d by removing one or more pairs of mirrored Gray-codes from the first Gray-code sequence; and

using Gray codes of the second Gray-code sequence as Gray-code write pointers or Gray-code read pointers.

17. (Original) The method according to claim 16, wherein the writing and the reading are asynchronous operations.

18. (Original) The method according to claim 16, wherein the writing and the reading are part of a first-in-first-out (FIFO) process.

19. (Original) The method according to claim 16, wherein the asynchronous data structure comprises a FIFO data structure.

20. (Withdrawn) A method for reducing a Gray-code sequence for use with a data structure of arbitrary depth, comprising:

listing a plurality of codes in a first Gray-code sequence;

deleting one or more first codes from the first Gray-code sequence;

deleting one or more second codes from the first Gray-code sequence, each second code having identical bits as a corresponding first code except for a most significant bit; and

forming a second Gray-code sequence from remaining codes of the first Gray-code sequence.

21. (Withdrawn) The method according to claim 20, wherein the data structure comprises an asynchronous data structure.

22. (Withdrawn) The method according to claim 21, wherein the asynchronous data structure comprises an asynchronous first-in-first-out (FIFO) data structure.

23. (Original) A method for designing an asynchronous data structure, comprising:

writing data to and reading data from a memory of depth d in which d is not equal to a value 2^n and in which d and n are integers;

reducing a first code sequence of length 2^n into a second code sequence of length 2d by removing one or more pairs of mirrored codes from the first code sequence; and

using codes of the second code sequence as code write pointers or code read pointers.

24. (Original) The method according to claim 23, wherein at least one of the first code sequence and the second code sequence has at least one of a closed property and a Hamming distance of one.

25. (Withdrawn) A method for reducing a code sequence for use with a data structure of arbitrary depth, comprising:

listing a plurality of codes in a first code sequence;

deleting one or more first codes from the first code sequence;

deleting one or more second codes from the first code sequence, each second code having identical bits as a corresponding first code except for a most significant bit; and

forming a second code sequence from remaining codes of the first code sequence.

26. (Withdrawn) The method according to claim 25, wherein at least one of the first code sequence and the second code sequence has at least one of a closed property and a Hamming distance of one.